

AFIT/GMO/LAS/97Y-8

CONSOLIDATING KC-10 CCTS TRAINING AT
TRAVIS AIR FORCE BASE

GRADUATE RESEARCH PAPER

Joseph C. Miller, Major, USAF

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GRADUATE RESEARCH PAPER

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Master of Air Mobility

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Abstract

Air Mobility Command is currently experiencing a decrease in its airlift capability. The C-141 fleet is retiring, the C-5 fleet has low reliability, and the projected C-17 fleet is slowly coming on-line, but at a total of only 120 aircraft. Because of this decreasing capability, the tanker fleet, especially the KC-10, can expect to fly even more airlift-type missions in the future.

In order to meet this demand, the KC-10 CCTS schoolhouse must be able to produce pilots at a reliable rate. Currently, CCTS is done at each of the two KC-10 bases, Travis AFB CA and McGuire AFB NJ. This study focused on the feasibility of combining the two schools into one at Travis AFB. McGuire AFB experiences a congested air traffic flow with Philadelphia, Baltimore, New York, and Washington DC airports all nearby, along with extreme weather fluctuations throughout the year. Travis AFB experiences little of this and is able to produce qualified students nearly 25-50% faster than McGuire AFB. A Tiger Team study conducted by AMC found that consolidation would be too expensive and the most economical means of training was to put the CCTS under the operational support squadrons at each base saving TDY, PCS, and facility costs. Their arguments appeared to have several flaws which are examined and areas of further study suggested.

CONSOLIDATING KC-10 CCTS TRAINING AT TRAVIS AIR FORCE BASE

I. Introduction

Background

The KC-10 Extender aircraft first came into the Air Force inventory in 1978. Its purpose was to augment the KC-135 fleet of air refueling tankers already in service. The KC-10 is capable of carrying 340,000 pounds of fuel with which it can air refuel other aircraft or, as a wide-body military derivative of a civilian aircraft, it can carry a combination of cargo and fuel not to exceed 340,000 pounds. When it first entered service it was controlled by the Strategic Air Command (SAC) and the Military Airlift Command (MAC). Aircrew training procedures established at that time have changed little over the past 20 years. SAC has been dismantled and MAC has been converted to the Air Mobility Command (AMC) but little has changed in the way KC-10 training is conducted.

Currently there is no dedicated Combat Crew Training School (CCTS) facility for KC-10 initial crew member qualification except at the two KC-10 operating bases. C-141, C-5, and KC-135 students train at Altus AFB Oklahoma with dedicated aircraft and maintenance support set apart from the operating units. Their training does not encroach upon operations at the combat units, whereas KC-10 CCTS training directly impacts the flying operations of the operational KC-10 units. All CCTS training for the KC-10 is accomplished at one of the two KC-10 bases, Travis AFB, California and McGuire AFB,

New Jersey. The training school uses aircraft assigned to the operational units; therefore, any delays in CCTS training can directly affect KC-10 operations as a whole, due to airframe availability, since the CCTS program receives priority over local training missions flown by the operational squadrons. For example, if a CCTS sortie is canceled on one day, for whatever reason, that sortie may be flown the next day replacing an operational training sortie. Local operational unit training sorties normally consist of some type of tanker and receiver air refueling along with traffic pattern work. This training is different from that accomplished out "on the road" flying true operational missions. On those, there are usually cargo, passengers, or both on-board and it is against the regulations to do traffic pattern transition (MCI 11-210, Vol. 3, 96:2). The training accomplished on operational missions is more along the lines of working with foreign controllers, international radio procedures, over-water navigation, and working with the USAF command and control system. The operations tempo and weather during the fall of 1995 and winter of 1996 exemplified the training problems encountered with the current system.

In September of 1995, Operation DELIBERATE FORCE took place in Italy to subdue Serbian aggression. Five KC-10 aircraft were required to fulfill the air refueling taskings. At the same time, McGuire CCTS had a large influx of students requiring qualification training. Their requirements plus those in Italy severely tasked the maintenance system. The operational units lost local training sorties to satisfy the CCTS need. This can greatly affect a unit if the pilots scheduled to fly the operational trainer were to go "noncurrent" for certain activities they were scheduled to accomplish. If a

pilot is noncurrent in an activity, such as refueling or landing, he is no longer allowed to perform that phase of flight until regaining currency with an instructor on-board. In January 1996, a blizzard struck the East Coast dropping over 30 inches of snow on McGuire AFB. Again, the lost CCTS sorties had to be made up at the expense of local operational-unit training.

As the fleet of approximately 200 C-141 aircraft is decommissioned in the near future, replaced by a 120-aircraft C-17 fleet, something is going to have to fill the airlift gap. The KC-10, with its great cargo capacity, is a likely option. The KC-135 fleet can also assist, but it is aging faster than forecast because of increased demands. Both the KC-10 and KC-135 fleets are also engaged year round in support of Operations SOUTHERN WATCH and NORTHERN WATCH in the Middle East as well as standard operational taskings such as SIDs, JA/ATTs, SAAMs, and Coronets (see Glossary, Appendix A). These taskings place a huge demand on the system for mission ready crews. As pilots leave the cockpit for staff and civilian jobs, the CCTS units must be able to manage the pilot pipeline to meet this demand on a consistent basis.

Problem Statement

Given only 59 KC-10 aircraft in the US Air Force fleet, an increasing operations tempo, an ever present mobility role, and a continuously decreasing budget, is it feasible for the USAF to consolidate KC-10 CCTS training into one unit.?

Questions

To adequately answer this question, several factors must be addressed. First, how severely is the training system being impacted by current practices? Current mission priorities are operational missions, then CCTS sorties, and finally local training missions. Is the CCTS squadron constantly inundated with new students, or was the student surge observed in September 1995 a unique phenomenon?

Is there a forecast increase in the KC-10's role for future operations? Will it become an even more critical element in the mobility arena? If so, can a dollar value be assigned to lost local training or delayed CCTS student output? For example, if the KC-10 will be assigned a growing operational mobility role, then fewer aircraft will remain on station, possibly to the detriment of CCTS training. Can a dollar value be assigned to the lost training and delayed student graduations that may occur if the KC-10s are not present?

Also, what are the expenses of consolidating the training and the associated temporary duty (TDY) costs that would come out of the squadrons' budgets? If consolidating, where would be the best place; an already established KC-10 base like Travis AFB or McGuire AFB, or a current training base like Altus AFB?

Answers to these questions will be investigated. An historical perspective of the KC-10, from procurement and an assignment in the Strategic Air Command (SAC), to the present day and its assignment to AMC, will also be presented.

II. Literature Review

History

The KC-10 Extender air refueling tanker became operational in the Air Force inventory in 1981. It was determined, after the Arab-Israeli conflict of 1973, that a greater air refueling capacity was needed in the United States Air Force. The Douglas DC-10 airframe was chosen, beating out the Boeing B-747 and Lockheed L-1011 civilian airframes. A civilian airframe was chosen because the research and development costs were already absorbed by the civil carriers that had purchased the aircraft, and a parts distribution and support infrastructure were already in place.

The KC-10 is the first tanker aircraft the Air Force purchased after the production run of KC-135 Stratotankers, which were produced from 1957 through 1963. It has an air refueling receptacle which allows it to on-load fuel as well as an air refueling boom for refueling Air Force aircraft and a drogue refueling system for Navy and allied aircraft refueling. The drogue system is a hose with a parafoil basket on the end into which the receiver pilot flies the probe on his aircraft. This greatly increases the flexibility of employing the KC-10 since it can refuel both Air Force and Navy/allied aircraft on the same mission. The KC-135 needs a special drogue adapter attached to the boom on the ground for a non-Air Force refueling mission, limiting its flexibility. The KC-10 can haul up to 170,000 pounds of cargo in addition to its large fuel capacity (AMMP, 1996: 5-42). Total carrying capacity is 340,000 pounds which gives it a maximum takeoff weight of 590,000 pounds since the plane weighs 250,000 pounds empty.

The initial purchase of the KC-10 was for sixteen aircraft with an additional purchase of forty-four in FY 83. By 1978, the Air Force decided to proceed with a contractor logistics support program with the Douglas Corporation (Joering, 1982:8). Initial procurement started in 1978 with the aircraft costing approximately thirty-five million dollars per unit. When the last airframe was produced, in 1987, the cost had risen to approximately seventy million dollars per aircraft (McDonnell Douglas, 1982).

Current Airlift Status

The U.S. Air Force is entering a time of decreasing airlift capability while, at the same time, the commitment to operations around the world and operations tempo is not decreasing. The Air Mobility Command, in its Air Mobility Master Plan (AMMP), has scheduled the retirement of the active duty C-141 fleet by 2003 and the reserve component by 2006. With the retirement of the C-141 and the decreased production rate of the C-17, AMC plans on increasing the use of the C-5s or augmenting lift with the C-130 fleet. At the same time, though, they also state that the C-5 has the lowest mission capable and reliability rates (AMMP, 1997:5-14). Due to these problems, the C-5 replacement is now scheduled for the year 2007 with the tanker replacement backed up to 2013 (GAO, 1996).

The C-17 has a great capacity and capability and was billed as the Air Force's answer to our decreasing airlift capability in future years. Though one C-17 can replace two C-141s in carrying capacity, they can still only go to one airfield at a time, a feat that two C-141s could obviously conduct simultaneously. Also, the C-130s may be able to

relieve some of the burden, but their slow delivery speed and small capacity may prove unacceptable.

AMC also states that they will try to use more contract airlift to maintain the Civil Reserve Air Fleet (CRAF). AMC states that it is becoming difficult to maintain an adequate business base for the CRAF carriers as we downsize. "Contracting too many missions to the commercial sector would reduce training opportunities for organic (military) crews which would degrade readiness; however, by not providing enough missions to commercial carriers, we erode the business base and reduce exposure of CRAF carriers to the military support structure." (AMMP, 1997:5-15). However, at a recent Air Mobility Warfare Center (AMWC) briefing for the Director of Mobility Forces (DIRMOBFOR) class, the briefer stated that there is plenty of business for contract airlift; there is a much greater concern for keeping the crews current. Either way, though, AMC loses out; if the contractors take the routes, crews don't fly enough. If contractors don't have enough of a business base to stay interested, operational crews and planes fly too to the detriment of airframe life and CCTS training as well as being more costly to the Air Force, since contracted flights are more economical.

The CRAF problem, along with the decreasing C-141 numbers and slow influx of C-17 aircraft, leave the KC-135 and KC-10 as the aircraft of choice to be used with increasing regularity in an airlift role. Increased usage of these two systems logically leads to increased wear and shortens the projected life-span of the weapon systems. Currently the KC-135 is experiencing corrosion problems that current technologies are unable to address. The civilian airlines don't keep aircraft in service for 35-45 years thus

no data are available on corrosion's long term effects. The Air Force is only now beginning to compile this data. This leaves AMC with the dilemma of not knowing how long its older aircraft will be able to operate (AMMP, 1997:5-16). Also, the KC-135E model aircraft have TF-33 engines which do not meet Stage III noise restrictions for the year 2000. Since these aircraft belong to the Air National Guard and Reserve forces, and usually operate out of joint-use airfields, their use in certain environments may be restricted. Studies are only now beginning on the feasibility of operating the E-model KC-135s into the 21st century (AMMP, 1997:5-41).

The KC-10 complies with Stage III noise restrictions and currently has a projected service life through 2043. A review of the weapon system and its supportability is scheduled to begin in the year 2000 (AMMP, 1997:5-43). Corrosion problems and a potential for a shortened life of the KC-135, a decreasing number of C-141s until final retirement, a reduced rate of C-17s entering operational status, the current low reliability rate of the C-5, the slow and limited capacity of the C-130 for strategic airlift, and the questionable ability of AMC to maintain civilian contract airlift interest, leave the KC-10, with its wide-body ability to haul up to 170,000 pounds of bulk, palletized cargo, available in an ever-increasing role to "pick up the slack" in the strategic airlift arena. In fact the AMC/CC, General Cross, alluded to just that at an Airlift/Tanker Association luncheon during a visit to McGuire Air Force Base in February of 1997 stating that "the KC-10 will fly more" (Brienza, 1997). This would free up the C-141, C-5, and C-17 aircraft to accomplish missions that are specific to that particular airframe. If the KC-10 is to be a key player in the increased operations environment the U.S. Air Force is

currently experiencing, the production of crew members from the CCTS schoolhouses must be on a regular basis. Delays only serve to increase stress on the operationally qualified forces.

As stated earlier, KC-10 training is done "in-house" at both Travis and McGuire Air Force bases. Conflicts developed between the CCTS units and the operational squadrons as to their airframe usage needs. To remedy that situation, AMC/XOT 'fenced' eight trainers at McGuire AFB and six at Travis AFB. McGuire's allotment was eventually raised to ten fenced airframes. The purpose of the fenced trainer program is to set aside a certain number of aircraft strictly for training purposes (both CCTS and operational unit training as well as maintenance training). Real-world missions and scheduled maintenance would occur with the remaining aircraft. So far the results have been positive.

III. Present System

Current Training Practices

Initial KC-10 training is composed of three phases; Phase IA, Phase IB, and Phase II. Phase IA consists of contractor-administered, Air Force-approved simulator training. Phase IB consists of the initial Air Force-administered flight training for the particular crew positions. After this initial qualification in the aircraft, Phase II completes the training necessary to make the student fully mission-ready (MR). This phase is completed through the individual squadron to which the student is assigned (MCI 10-202 Vol 3, 1995) This paper will focus on Phase IB training, the flying training conducted by the CCTS squadrons. It will also focus on the pilot training aspect since including all crew positions and the different variables associated with each of them is beyond the scope of this paper.

MCI 10-202, Volume 3 states that initial qualification training (Phase IA and IB) should take no more than 125 days for active duty and 180 days for reserve students. This difference is due to the fact that reserve students have civilian jobs and training completion dates are extended to prevent conflicts with this primary job. Taking into account the time required for an active duty student pilot to complete Phase IA, this leaves 68 days for the completion of Phase IB. In addition, the MCI asserts that Phase IB, the flight training phase, *should* be entered no later than five duty days after the completion of Phase IA. This is so that knowledge retention is not degraded over time between Phases IA and IB. Phase IB training is driven by proficiency in tanker and

receiver air refueling as well as takeoff, landing and a variety of different types of approaches. As will be shown later, the various aspects of the air refueling phases of flight are a primary contributor to McGuire's inability to complete training on schedule.

McGuire Experiences

As stated above, AMC would like their crew members to begin flying training within five days of completion of Phase IA. As shown in Figure 1, McGuire AFB has been unable to meet this goal throughout 1996.

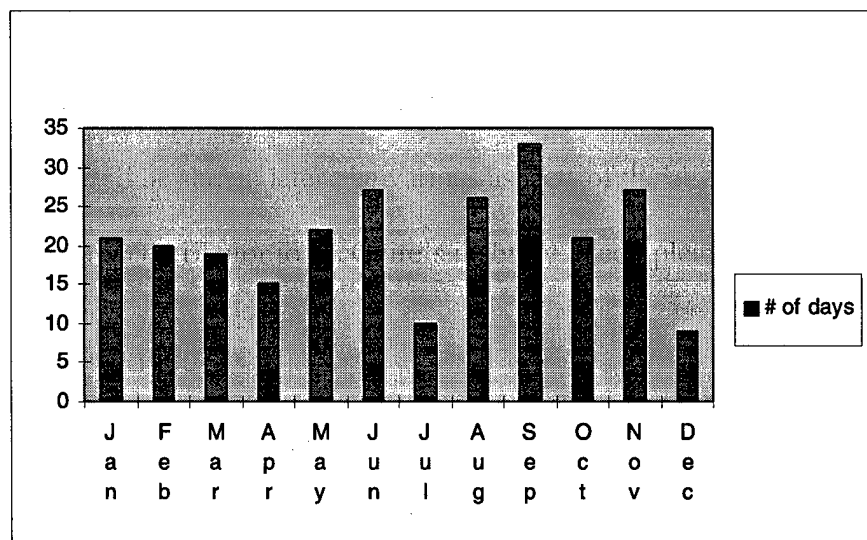


Figure 1. Number of Days Until Students' First Flight, 1996 (Reed, 1997)

McGuire AFB possesses a permanently assigned KC-10 aircraft fleet (PAA) of 32 aircraft. Of those 32, seven are allotted between phase inspections at the contractor's facility (C-check) in Greenville, North Carolina and the Edwards AFB test facility in California. This leaves McGuire with 25 aircraft in possession. AMC allows for one

spare aircraft, three for maintenance discrepancies and the remaining 21 for training sorties and taskings from the Tanker Airlift Control Center (TACC) at Scott AFB. Thirteen of those 21 are forecast to be off-station at any given time while the remaining eight were "fenced" for training purposes only. AMC raised the number to 10 when they were to introduce Global Positioning System (GPS) training in the summer and fall of 1996 but, due to delays in the GPS program, they delayed the training and the fenced trainer number was returned to eight. These fenced trainers were to be used for CCTS training, both active duty and reserve, along with training for two active duty operational squadrons and the two reserve operational squadrons. Maintenance was also to use these aircraft for their in-house training.

According to Major Jim Reed, KC-10 instructor and assistant chief of the 305 AMW KC-10 CCTS schoolhouse, the maintenance contract is somewhat restricted due to McGuire's effective maintenance manning levels. A typical week's flying schedule for the entire wing, with eight fenced trainers, is as follows:

Monday: 4-turn-4 (4 day flights, 4 night flights)

Tue-Wed-Thu: 6-turn-6

Friday: 4-turn-2

The reason for this system is that half the maintenance force works Sunday and Monday, the whole force works Tuesday, Wednesday, Thursday, and half the force works Friday and Saturday. This aircraft availability schedule is for all CCTS, operational and reserve force training. Reed said that, with 10 fenced trainers, maintenance was able to meet the demands of the flying schedule, but with eight they're having trouble. Lieutenant Colonel

Brienza, 605 AGS/CC at McGuire AFB, states that the manning problems for maintenance troops are not KC-10 specific; the Air Force in general is having manning problems. The problem McGuire AFB had generating sorties was that the maintenance manning level is at approximately 85%. That number alone is not a big problem. The problem lies in the fact that the pilot manning levels for the KC-10 squadrons are at 120-150% and the sortie levels required to keep such a high number of pilots current and qualified were too much for the lower-manned maintenance squadrons to support. The remedy for this, says Lt. Col. Brienza, was the discontinuation of flying during non-Unit Training Assembly (USAFR) weekends. This allowed them to catch up on outstanding maintenance discrepancies. "You just can't fly these planes seven days a week", he said. "They need some scheduled down-time" (Brienza, 1997).

The average pilot in CCTS should be getting one and a half sorties a week according to Major Reed. Their normal schedule is mission plan one day, fly the next, and debrief on the third day. Then the cycle repeats itself. The major problem McGuire AFB is having in following this cycle, and thus processing their students in a regular fashion, is with the air refueling portion of the program, both as the receiver and the tanker.

During the tanker portion of the training, crews are losing their mated receivers which frequently come out of McGuire AFB in the form of C-141 aircraft. According to Major Reed, the way the C-141s are tasked by TACC limits their scheduling flexibility. If their schedulers don't have a crew or a jet the day prior to the mission, they cancel the air refueling with the KC-10 CCTS, thus this portion of training for the sortie is lost.

Reed also states that McGuire has had enough KC-10 maintenance cancellations in the past that other units, namely fighter units in the southern bases, are not confident in the KC-10's reliability and therefore cancel out of scheduled refueling missions, again resulting in the loss of scheduled tanker training on the mission. Added to this is the fact that, as of the last Base Realignment and Closure Commission (BRACC) board, there are now no active duty KC-135 units in the northeast. KC-10 CCTS students are required to be proficient at receiver air refueling behind a KC-135 under both day and night conditions. Reed states that many of the guard KC-135 units do not want to fly past 0100-0200 Zulu time (2100-2200 EST). This makes night refueling difficult to obtain especially during the summer months when sunset occurs later in the evening.

As a result, Major Reed calculates approximately a 77.7% average sortie effectiveness rate for receiver air refueling and a 73.7% average effectiveness rate for tanker air refueling during calendar 1996 (Appendix B). These low effectiveness rates hinder student continuity and proficiency. They also result in the necessity to generate extra sorties for these students reducing sorties for the operational squadrons' training.

Effective maintenance manning levels at McGuire AFB were mentioned earlier in relation to the maintenance contract and sortie production. To compound McGuire AFB's training woes, effective maintenance manning at McGuire AFB has begun to drop. This has had an impact on sortie production. For example, Major Reed stated that in February of 1997, an Air Expeditionary Force (AEF) exercise required the deployment of the remaining qualified crew chiefs on station (those not already deployed for Operation SOUTHERN WATCH). As a result, there were no crew chiefs left on station and local

flying came to a halt, once again setting back CCTS training. The reasons for the loss of maintenance manning is a personnel question that is outside the bounds of this paper. Major Russ Severino, AMC/DOT, informed the author that AMC/DP is investigating the issue.

All these delays serve to push student graduations up to or past the AMC limit. As Figure 2 shows, the average number of days a student pilot was in CCTS training at McGuire AFB for 1996 was 66.4 days.

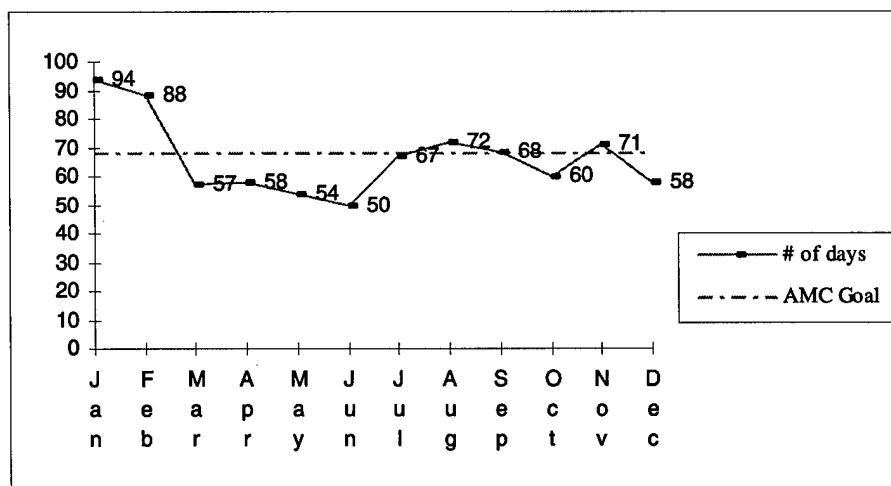


Figure 2. Number of Days to Phase IB Completion, 1996 (Reed, 1997)

Travis Experiences

In conversations with Travis AFB CCTS, the author was told by instructor pilot and 60 AMW CCTS chief, Major Isabelle Kalocsay, that Travis AFB was not experiencing any of these types of problems. She said they have their occasional lost training for a broken jet or a canceled tanker/receiver, but nothing on the order of magnitude like McGuire AFB. They are also not experiencing any delays in getting the

pilots their initial sortie within five duty days of Phase IA completion. She stated that the average number of days to a student's first flight in Phase IB is 3.4 duty days. The average number of days for the various pilot courses in Phase IB to be completed are as follows:

Initial Qualification; Pilots (Course no. KC-10-1):	38.95 days
Initial Qualification; Aircraft Commanders (Course no. KC-10-1):	44.81 days
Pilot Upgrade: (Course no. KC-10-4)	38.21 days
Instructor Pilot Upgrade: (Course no. KC-10-18)	29.04 days
Average of all pilot training courses	37.75 days

(Kalocsay, 1997).

With the variables at McGuire AFB that confound the CCTS process not present at Travis AFB, would consolidation of KC-10 CCTS at Travis AFB be economically feasible so that McGuire AFB might capitalize on that flying environment? Chapter IV will address this question and others so that a reasonable conclusion might be reached.

IV. Findings and Analysis

Alternatives

This chapter discusses two options in revising KC-10 training; consolidation at Altus AFB and consolidation at Travis AFB.

In March of 1994, the Formal School Objectives Tiger Team conducted a study on the most cost-effective method of conducting KC-10 training (Appendix C). They looked at three options. First, centralizing CCTS training at some place other than Travis AFB or McGuire AFB. Second, establishing an active duty unit at Travis AFB or McGuire for the sole purpose of CCTS training for all KC-10s. Finally, conducting CCTS training at both Travis AFB and McGuire AFB under the Operational Support Squadrons (OSS) at each base. In 1994, CCTS training was done within the operational squadrons. They released their results to the AMC/DO in a memorandum in September of 1994 (Morey, 1994).

In those results, they mentioned some benefits that may be realized from consolidation of CCTS training. These include:

- a.) Units will receive a more standardized product with one KC-10 CCTS school house.
- b.) The total number of active duty instructors required to conduct the training would drop from 30 to 28.
- c.) Centralizing the CCTS program would bring KC-10 training in-line with the way AMC conducts formal training with the rest of its major weapon systems.

d.) Moving CCTS out from under the active duty squadrons would reduce competition between the operational and training schedulers for scarce resources.

The team also determined that there would be significant costs associated with such a centralization of assets (excluding the costs of operating the actual facilities). These are:

- a.) A \$25M/year cost of operating a 6 PAA CCTS squadron requiring 152 personnel.
- b.) An active duty TDY student cost of \$1.5M/year.
- c.) Since a centralized CCTS would require a simulator facility at that location, the cost of a two-bay facility would be around \$6.6 million (if using Option 1). If locating the CCTS simulator facility at Travis AFB or McGuire AFB, adding a third bay to the preexisting two-bay facility (one for operational training and two for CCTS use, Option 2) would cost approximately \$2.4 million.
- d.) The costs associated with establishing a new COMBS facility (Contractor Operated Maintenance Base Supply) for the first option would run approximately \$13.9 million. This cost would not be incurred using either of the other options since COMBS is set up already for the operational squadrons.

Their calculations of the total yearly costs associated with the various options were:

- a.) Option 1: \$47 million
- b.) Option 2: \$28 million
- c.) Option 3: no cost

Obviously, from the results of their investigation, Option 3, retaining CCTS training at each of the KC-10 bases and just realigning them under the operations support squadrons, was the most cost efficient and eventually implemented.

One can look at some of their arguments and find fault. For instance, they state that moving KC-10 CCTS out from under the operational squadrons to the operational support squadrons would lessen competition for the "scarce resources". However, the number of resources has not changed, only the priority with which CCTS is able to schedule sorties. Before, when in the operational squadrons, CCTS schedulers could have had the same priority if the director of operations (DO) or squadron commander so dictated. Also, when CCTS was in the operational squadrons, the schedulers for both were located together so coordination and "sortie juggling" was more expeditious. With CCTS under the OSS, they are basically treated like another squadron at the wing and are still subject to competition, to a certain extent, for the resources and effected by taskings that come down to the wing from the TACC. This would not be so if CCTS were consolidated, assigned their own PAA aircraft, and removed from under control of the operations group.

The Tiger Team also argued that 152 personnel would be required to operate a consolidated CCTS operation at a cost of \$25M/year. This figure was for a KC-10 CCTS at a base such as Altus AFB. If the consolidation was at Travis AFB, they estimate personnel requirements at 147 but base their dollar figures on the 152 number.

Another argument against the Tiger Team's costs would be the figure of \$2.4 million for adding a third simulator bay to the two bays already established at the current

KC-10 facilities (Option 2). Both Travis AFB and McGuire AFB have two simulator facilities already in place. Students permanently assigned to those bases could do their initial Phase IA training at their base (current practice) then go TDY to the CCTS base for their Phase IB training. This would eliminate the Tiger Team's \$2.4 million figure for the third simulator bay and may reduce their \$1.5M/year figure for TDY costs since students would only be TDY for Phase IB instead of both Phase IA and IB. The \$1.5 million figure itself is questionable. They state \$1.5 million for TDY costs for Option 1 (Altus AFB) and \$0.8 million for Option 2 (Travis/McGuire AFBs) in Figure 5, yet in Figure 4 they state that Option 1 TDY costs are \$0.91 million while Option 2 TDY costs are \$0.46 million. They also state, in Figure 5 that the total cost of Option 1 is \$40.4 million, yet in the text of their study state that the cost is \$47 million.

Finally, the team states that the \$25 million annual cost to run a separate, 152 person CCTS is \$0 dollars if the training is done at the operations support squadrons. Most of those same people are currently in the operational, CCTS, and maintenance squadrons, therefore the manpower dollars are still being spent. The costs of the proposed 6 PAA aircraft for the consolidated CCTS squadron are still out there. They are spread throughout the 305 AMW and the 60 AMW. There would be extra costs with a separate squadron (administration, command structure, etc.) but the costs currently being incurred should have been removed to "level the playing field".

Altus AFB

The figures do speak plainly regarding setting up a consolidated CCTS at a base other than a current KC-10 base. Assuming this option would be Altus AFB Oklahoma where AMC does all its other CCTS training, with the exception of the recently-retired C-130s, the costs would be, in the Tiger Team's study, approximately \$47 million for the first year and then about \$41.5 million per year each year after that once the simulator facility was established (FY 95 dollars). Added to this is the fact that Altus recently acquired the C-17 CCTS program. According to Major Jim Howard, who worked the BRACC issues and C-17 beddown at Altus AFB, the aircraft parking ramp and support structure at the base are saturated. There simply is no excess capacity to bring in the KC-10 school house without a major expenditure of dollars.

Travis AFB

In addition to the above Tiger Team study from 1994, another study was completed by the 15 AF in 1991 when the KC-10s were stationed at March AFB CA, Barksdale AFB LA, and Seymour Johnson AFB NC. It looked at consolidating KC-10 CCTS at one of the KC-10 bases, namely March AFB, with a PAA of six aircraft. Their proposal also indicated that the CCTS would only be for the Phase IB portion of the training. Their arguments for the consolidation are similar to those of the Tiger Team; standardized training, central core of expertise, provides an avenue of professional advancement for instructors, economies of scale, and improved continuity that is lost

when CCTS instructors must deploy in support of operations (Felts, 1991). They also developed some substantial economic cons to consolidation (1991 dollars):

- a.) Approximately \$280,000 to PCS instructors and additional maintenance personnel.
- b.) Annual TDY costs of \$514,000 to \$817,000 to billet students depending on whether they are on-base or off-base.
- c.) MILCON costs of approximately \$870,000 to establish new squadron and dormitory facilities.

Costs of additional ramp space and support facilities for a PAA of six aircraft were not addressed.

The Tiger Team determined that TDY costs for crew members to Travis AFB would be approximately \$455,432 annually compared with \$907,338 if they went to a base like Altus AFB. This reduction is due to the fact that half the students would already be permanently assigned to Travis AFB. In 1996, AMC started a new program accepting boom operators and flight engineers with no prior experience (in the past they cross-flowed from another aircraft). This training can take up to one year and, under consolidation, would require the PCS of these students to Travis AFB prior to continuing to their follow-on assignment at McGuire AFB (if their assignment dictated so). This would be an additional PCS cost but a decrease to the TDY figure.

V. Conclusion

Summary

KC-10 training at McGuire AFB is currently operating under many constraints; extreme weather fluctuations throughout the year, an unending stream of operational taskings, declining maintenance manning levels, and extremely congested airspace around the local flying area. Throughout calendar year 1996, there were only two months, July and December, where they were able to meet their goal of getting student pilots their first flight within ten calendar days (five working days) of completing Phase IA training. At the same time, Travis reports not having any problems meeting the guidelines set forth in MCI 10 -202, Vol 3 of five working days to the student's first flight. In fact, they have so few problems meeting timing guidance that they don't track it on a regular basis. Deviations are recorded in the students training folders and briefed at the quarterly Training Review Panels (TRP) but they are few in comparison to McGuire AFB.

Steps have been taken by the command to assist the CCTS schools and their students with some continuity in training. For example, a student who came to CCTS for the pilot upgrade or instructor upgrade programs often had a job such as executive officer or scheduler in the operational squadron. They were often times back at the squadrons helping out in their old capacities when not busy at the CCTS. Both Travis AFB and McGuire AFB reported this phenomenon. Lt. Col. Thomas, 60 OSS/CC at Travis, wrote a position paper detailing these problems and suggested that students be assigned TDY to

the CCTS while in school (Thomas, 1996). Additionally, AF/DPX released Message PR231730Z SEP 96 stating that all officers who attend in-utilization training for eight weeks or more will have an AF Form 475, Education/Training Report, documented and entered into their permanent records. This will hopefully remove feelings of obligation a student may have, during his training, towards the operational squadron which writes his OPR.

Travis AFB also developed a plan for incorporating its two reserve and one active duty CCTS programs into one schoolhouse. The program, developed by former CCTS chief Major Jim Kotowski, was recently recognized during an Aircrew Standardization Evaluation inspection (ASEV) as a benchmark program.

In FY 96, the 60 AMW trained 111 students while the reserve unit, the 349 AMW (AFRES) trained 52 students. Kotowski states, "The average cost of KC-10 flying time is \$7500 per hour. Combining both units' training time, the total is over \$16.9 million. The 60 AMW CCTS schedules two students per sortie to facilitate sortie effectiveness. Due to training limitations, the 349 AMW usually schedules one student per aircraft" He argues that by combining the three schoolhouses (two reserve and one active duty) and scheduling two (pilot) students per sortie, economies of scale can be realized with a subsequent cost savings (Kotowski, 1997). In Major Kotowski's figures, he used a KC-10 cost per hour of \$7500 resulting in an annual savings of \$1.2 million (53 sorties saved, totaling 140 hours at \$7500/hour). The author has been unable to confirm the \$7500-per-hour figure but found that AFI 65-503, Attachment A15-1, uses a KC-10 dollar value of

\$4830 per hour for DOD missions. Using this figure, an annual savings to the Air Force of \$676,200 can be realized (AFI 65-503, Attach. A15-1, 1996).

Conclusion

Consolidation of KC-10 CCTS at Travis Air Force Base California obviously involves some costs. Establishing a training facility, a staff to run it, an aircraft PAA of six, and maintainers to keep them flying have an estimated annual budget of approximately \$25 million, though the losing units should see a decrease in their budgets due to the loss of PAA and personnel to the CCTS squadron. Conflicting data on additional TDY costs for the aircrews show a dollar figure between approximately \$455,000 and \$1.5 million annually. Using the Tiger Team's figures, it appears that there is a significant annual cost to AMC for doing training in this fashion, though this is the way training is being completed for other aircraft in the command.

Current conditions at McGuire AFB result in late initial flights for the students and lost training which result in an added cost (\$4830/hr X no. of hours/sortie) to the Air Force, a forfeited sortie for the operational unit, and the potential for late graduation from CCTS which confounds operational schedulers who were planning on using the students for squadron operations. The cost of one five-hour sortie is about \$24,000 and is not significant when compared with costs of setting up a CCTS operation at Travis AFB (provided these additional sorties are a rarity). Additionally, if Major Kotowski's program is implemented at McGuire AFB, combining active duty and reserve CCTS, AMC may realize some savings due to economies of scale. Student continuity may be enhanced due to the fact that AFRES instructors working in this new wing-consolidated

CCTS may remain on-station, preventing lost training, when the active-duty troops are called on to deploy. Such was the case for Operation DESERT STORM and KC-10 CCTS was virtually shut down (Therianos, 1991). Note that the annual savings mentioned above under major Kotowski's program are also in-line with the estimated annual TDY costs proposed by the AMC Tiger Team for a six PAA CCTS unit at Travis AFB .

Finally, despite all the problems McGuire AFB appears to be encountering as mentioned at the beginning of this chapter and the delayed Phase IB flying and lost training, they still are generally able to complete their training within the time lines established by the command (average of 66.4 days for 1996, Figure 2), though Travis AFB is averaging 37.75 days in Phase IB training. The large deviation in January and February was due primarily to the severe winter storms previously mentioned in Chapter I. Major Reed says he is expecting a large influx of students in the spring of 1997. With the fenced trainers now back down to eight from ten, he fears that McGuire AFB CCTS may one more begin to fall behind the "power curve".

In conclusion, a large expenditure of funds for the consolidation of KC-10 training at Travis AFB would be difficult to justify in this day of decreasing budgets. Every instructor pilot the author talked to thought consolidation was a great idea and would like to see it happen for continuity purposes, but the current system is meeting the guidance established by AMC. Enactment of Major Kotowski's AFRES/active duty plan appears to have merit and should be considered for broader application. It was designated a

benchmark program during a recent inspection and can provide the cost savings and continuity currently being sought.

Suggestions for Further Study

Unfortunately the 1994 Tiger Team study could not take into account problems specific to McGuire AFB such as air traffic congestion, severe weather fluctuations, and a high operations tempo before the KC-10 BRACC move was accomplished in 1994. If so they may have been able to assign a value to lost or repeated training and later CCTS graduations (66.4 days at McGuire AFB verses 37.75 days at Travis AFB, in addition to first sortie delays at McGuire AFB that are almost four times greater those experienced by Travis AFB). This may possibly have offset some of their figures arguing against a consolidated KC-10 CCTS.

A more in-depth study into developing a dollar value to be assigned to lost training, or a value to be assigned to each extra day a pilot takes to finish training, and showing how much it is costing AMC with the delayed training (or how much they save with timely training such as that Travis AFB experiences) may prove beneficial. This, combined with a more accurate cost analysis of creating and operating a 6 PAA CCTS unit may show a much smaller spread of dollars between standing up an autonomous CCTS and the status quo.

Appendix A: Glossary

Coronet - A fighter air movement, normally across the ocean, in which one fighter unit is deployed to a foreign country, and led by air refueling tanker aircraft, replacing another which is already in-country.

JA/ATT - Joint Airborne/Air Transportability Training. Continuation and proficiency combat airlift training conducted in support of DOD agencies. Includes airlift load training and service school support (MCI 11-210, Vol 1, 1996:6)

SAAM - Special Assignment Airlift Mission. Funded airlift that cannot be supported by channel missions because of the unusual nature, sensitivity, or urgency of the cargo or that requires operations to points other than the established channel structure (MCI 11-210, Vol. 1, 1996:7).

SID - Strategic Intertheater Deployment. Airlift assets contracted out by a DOD user. Normally accomplished in the Pacific theater in support of the Navy.

Appendix B: Lost Training Activity, McGuire AFB

The following diagrams were extracted from the 305 AMW CCTS Training Review Panel (TRP) for calendar 1996 prepared by Major James Reed. The panel meets on a quarterly basis to review student training progress. Lost activity refers to that activity which was not accomplished on a particular sortie though other aspects of the mission may have been executed. The legend for the acronyms in the following figures is as follows:

D AR - Day Air Refueling

N AR - Night Air Refueling

TKR AR - Tanker Air Refueling

CELL - Cell Formation Flight

D LAND - Day Landing

N LAND - Night Landing

2.2 Maintain maximum readiness by optimizing personnel,
equipment and training

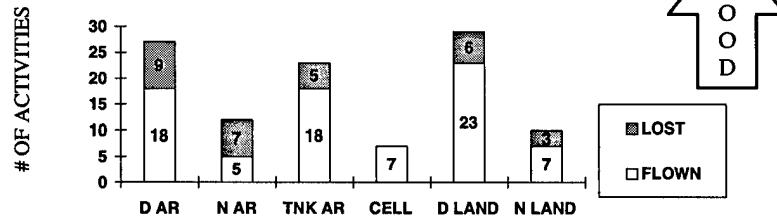
CCTS ACTUAL SORTIE ACTIVITY JANUARY

AMC GOAL: N/A

305 GOAL: < 10 % LOST ACTIVITY

SORTIE EFFECTIVENESS: 59% (RCVR AR) 78% (TKR AR)

LOST ACTIVITY: 33% 58% 22% 0% 21% 30%



Recommendation: None

OPR: 305 OSS/OST, DSN 440-3822/COMM (609) 724-3822

Figure 3. Actual January CCTS Sortie Activity

2.2 Maintain maximum readiness by optimizing personnel,
equipment and training

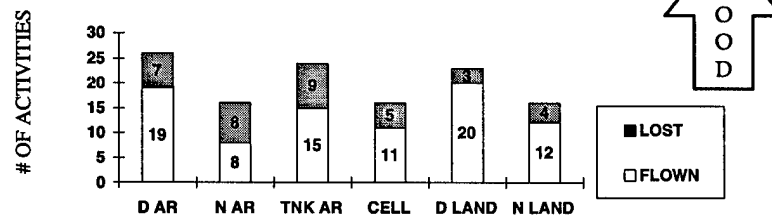
CCTS ACTUAL SORTIE ACTIVITY FEBRUARY

AMC GOAL: N/A

305 GOAL:

SORTIE EFFECTIVENESS: 64% (RCVR AR) 63% (TKR AR)

LOST ACTIVITY: 27% 50% 38% 31% 13% 25%



Recommendation: None

OPR: 305 OSS/OST, DSN 440-3822/COMM (609) 724-3822

Figure 4. Actual February CCTS Sortie Activity

2.2 Maintain maximum readiness by optimizing personnel,
equipment and training

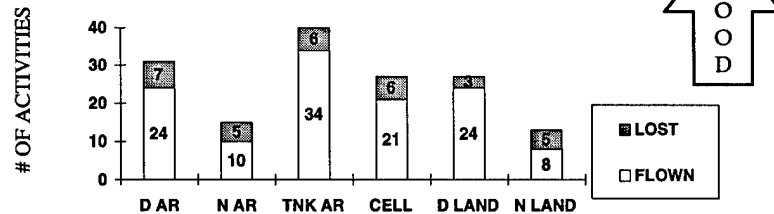
CCTS ACTUAL SORTIE ACTIVITY MARCH

AMC GOAL: N/A

305 GOAL: < 10 % LOST ACTIVITY

SORTIE EFFECTIVENESS: 74% (RCVR AR) 85% (TRK AR)

LOST ACTIVITY: 23% 33% 15% 22% 11% 38%



Recommendation: None

OPR: 305 OSS/OST, DSN 440-3822/COMM (609) 724-3822

Figure 5. Actual March CCTS Sortie Activity

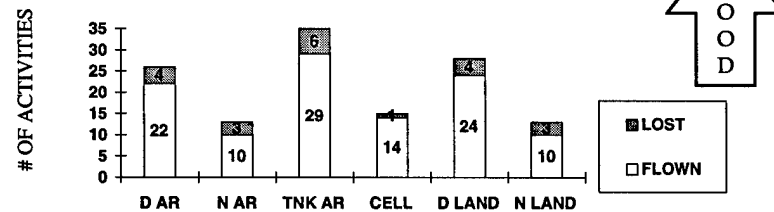
CCTS ACTUAL SORTIE ACTIVITY APRIL

AMC GOAL: N/A

305 GOAL: < 10 % LOST ACTIVITY

SORTIE EFFECTIVENESS: 82% (RCVR AR) 85% (TKR AR)

LOST ACTIVITY: 15% 23% 17% 1% 14% 23%



Recommendation: None

OPR: 305 OSS/OST, DSN 440-3822/COMM (609) 724-3822

Figure 6. Actual April CCTS Sortie Activity

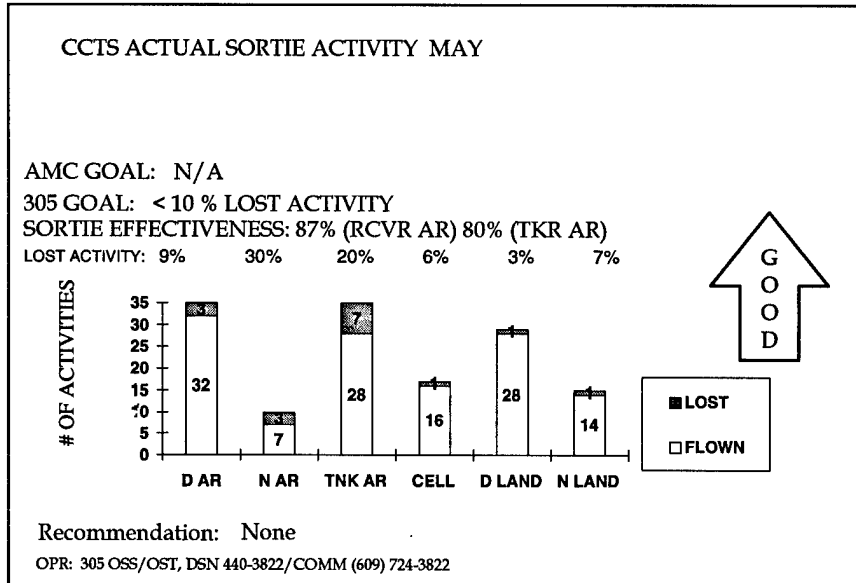


Figure 7. Actual May CCTS Sortie Activity

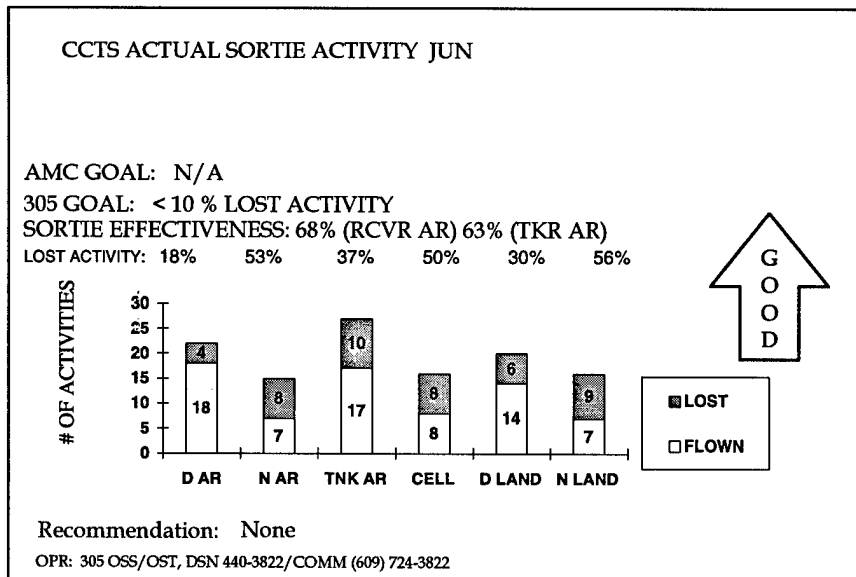


Figure 8. Actual June CCTS Sortie Activity

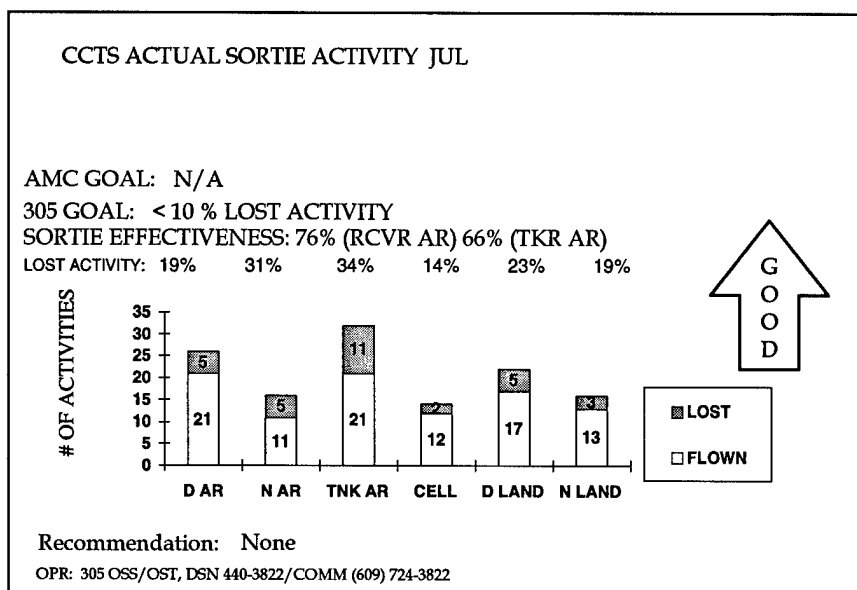


Figure 9. Actual July CCTS Sortie Activity

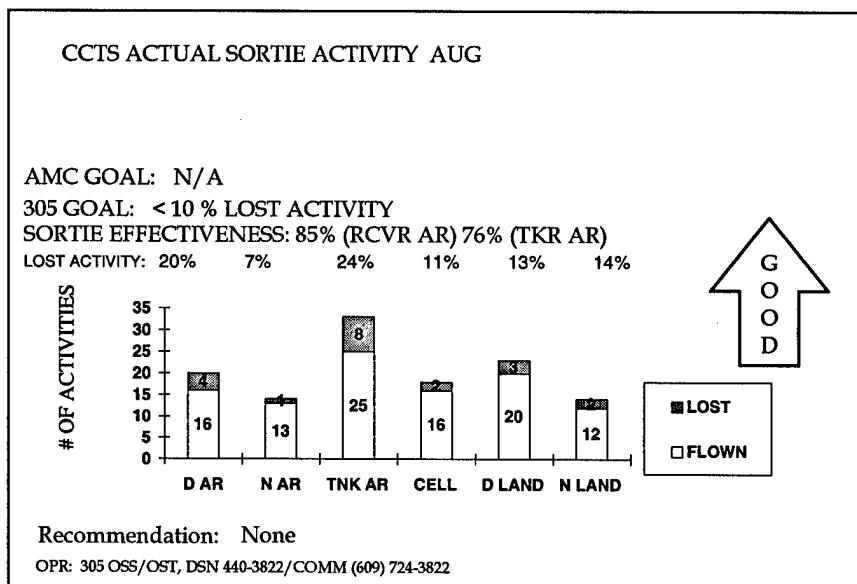


Figure 10. Actual August CCTS Sortie Activity

CCTS ACTUAL SORTIE ACTIVITY SEP

AMC GOAL: N/A

305 GOAL: < 10 % LOST ACTIVITY

SORTIE EFFECTIVENESS: 77% (RCVR AR), 58% (TNK AR)



CCTS ACTUAL SORTIE ACTIVITY NOV

AMC GOAL: N/A

305 GOAL: < 10 % LOST ACTIVITY

SORTIE EFFECTIVENESS: 85% (RCVR AR), 83% (TNK AR)



Appendix C: AMC Tiger Team Study, September 1994

The following was extracted from the memorandum for the AMC Director of Operations (DO) from AMC/DOT concerning the Tiger Team Action Item # 6.28, Centralized KC-10 CCTS, 2 September 1994 (Morey, 1994):

1. The Formal Schools Objectives Tiger Team which met 21-25 March 1994, recommended AMC look into the possibility of establishing a centralized KC-10 schoolhouse with the upcoming moves to Travis and McGuire. Presently, KC-10 formal school training is accomplished in-unit. Past initiatives to establish a centralized combat crew training school (CCTS) were shelved, largely due to the cost of moving hardware and personnel. A working group met to review the following options:

- a. OPTION 1: Establish a centralized CCTS located somewhere other than Travis or McGuire.
- b. OPTION 2: Establish a third active duty squadron at either Travis or McGuire whose sole purpose is to conduct all KC-10 formal school training.
- c. OPTION 3: Establish a CCTS function within the operations support squadron (OSS) at both Travis and McGuire. This would require moving CCTS instructor positions presently located within each squadron into the OSS.

2. The current method of in-unit training has proven to be extremely cost effective; however, several benefits may be realized by centralizing CCTS:

- a. Since one KC-10 schoolhouse will train all initial qualification students, units will receive a more standardized product.
- b. Moving the CCTS function out from underneath the squadron will reduce competition between operational and training requirements for scarce resources.

c. Consolidation of the CCTS function will reduce the total number of active duty instructors required to conduct training from 30 to 28.

d. Centralizing KC-10 CCTS would more closely align KC-10 formal school program with other MWS programs.

3. There are significant costs associated with the centralized CCTS (excluding facility costs):

a. Cost of operating a 6 PAA CCTS (152 personnel) is approximately \$25M/year.

b. Active duty student TDY costs: \$1.5M/year

c. A centralized CCTS would require establishing a KC-10 simulator facility at the CCTS location. Cost of building a two-bay facility is approximately \$6.6M (Option 1). If located at McGuire or Travis (Option 2) a three-bay simulator facility would be required (two for formal training; one for operational squadron use). Although total cost to operate the contractor portion of the ATS should remain approximately the same, cost to add a third bay to the KC-10 simulator facility would be \$2.4M (total for Option 2: \$9.0M)

d. Cost to operate a separate COMBS facility (Option 1) is approximately \$13.9M. If located at Travis or McGuire (Option 2) this cost would be eliminated. e. Total yearly cost for a separate CCTS would be:

(1) Option 1: \$47M

(2) Option 2: \$28M

(3) Option 3: No cost

4. Bottom line: Consolidation of the CCTS function has merit; however, the costs associated with consolidating at one location far outweigh the benefits. Establishing the CCTS under the operations support squadron at each location (Option 3) would be a better alternative. This would provide some autonomy with regard to operational requirements, while still providing the wing commander control over the product. Current Air Force objective wing structure does not recognize a formal KC-10 CCTS outside the squadron.

RECOMMENDATION:

5. Recommend submission of an objective wing variance establishing a separate CCTS as a flight within the operations support squadron at both Travis and McGuire AFBs.

The following figure, Figure 3, was also extracted from the same report. It depicts the manpower requirements for various scenarios involving the placement of the KC-10 CCTS. Figure 4 is an extract that depicts the annual TDY costs associated with the various CCTS classes that are taught through the schoolhouse. These are:

- KC-10-1 Pilot and Copilot Initial Qualification
- KC-10-2 Flight Engineer Initial Qualification
- KC-10-3 Boom Operator Initial Qualification
- KC-10-3A Loadmaster to Boom Operator Qualification (AFRES)
- KC-10-4 Pilot Upgrade Qualification
- KC-10-10 Instructor Pilot Requalification
- KC-10-18 Instructor Pilot Upgrade
- KC-10-18A Instructor Flight Engineer Upgrade
- KC-10-18B Instructor Boom Operator Upgrade (MCI 10-202, 1995:9)

KC-10 WHAT IF

For: KC-10 CCST WORKING GROUP

Maj Pat Heatherman, XOTK, 6-5553

Prepared by: Joanne Ahrens/XPMPP/3 May 94

These manpower figures are for programming/planning purposes only, and may be subject to change

Option #1

1. Consolidate KC-10 schoolhouse at either Travis or McGuire.

2. Active only.

3. Assumes maintenance is added to an existing aircraft maintenance structure.

4. No maintenance man-hour per flying hour factor available.

Maintenance SPA is normal mission maintenance

		O	E	C	T
Instructors	Pilots	10	0	0	10
(48 PAA)	Flt Engr	0	8	0	8
	Boom Op	0	8	0	8
	subtotal	10	16	0	26

Maintenance

(20.23 spaces per acft) 6 PAA

		3	118	0	121
TOTAL		13	134	0	147

*Instructors were worked at 13 per base for 48 total PAA. Some savings would probably result from combining at the same base.

Option #1A

1. Consolidate KC-10 schoolhouse at either Travis or McGuire.

2. Active only.

3. Assumes maintenance is added to existing aircraft maintenance structure.

4. No maintenance man-hour per flying hour factor available.

Maintenance SPA is normal mission maintenance.

		O	E	C	T
Instructors	Pilots	12	0	0	12
(54 PAA)	Flt Engr	0	8	0	8
	Boom Op	0	8	0	8
	subtotal	12	16	0	28

Maintenance

(20.23 spaces per acft) 6 PAA

		3	118	0	121
TOTAL		15	134	0	149

* Instructors were worked at 14 per base for a total of 54 total PAA. Some savings would probably result from combining at the same base.

OPTION #2

1. Consolidating KC-10 schoolhouse at Altus AFB.

2. Active only.

3. Assumes maintenance added to an existing aircraft maintenance structure.

4. No maintenance man-hour per flying hour factor available.

Maintenance SPA is normal mission maintenance.

Instructor and maintenance manpower numbers same as Option #1.

Option #3

1. Consolidating KC-10 schoolhouse at Base X (unknown)

2. No existing maintenance structure in place.

6 PAA		O	E	C	T
Overhead		2	3	0	5
Instructors	Pilots	10	0	0	10
	Flt Eng	0	8	0	8
	Boom Op	0	8	0	8
Maintenance (20.23)		3	118	0	121
TOTAL		15	137	0	152

Figure 15. Centralized CCTS Manning Scenarios

Student TDY Cost to Attend a Centralized KC-10 CCTS

Option 1: Centralized CCTS at other than Travis or McGuire

COURSE	CLASS DAYS	TRAVEL DAYS	TDY DAYS	PEOPLE/ CLASS	PER DIEM/ DAY (\$)	TRAVEL COST (\$)	LODGE COST (\$)	PD COST (\$)	TOTAL COST PE CLASS	TOTAL FCLASSES	TOTAL COST (\$)
KC-10-1	55	2	57	2	26	1,120	1,168	2,964	5,252	57	299364
KC-10-4	13	2	15	2	26	1,120	496	780	2,396	27	64692
KC-10-10	28	2	30	2	26	1,120	736	1,560	3,416	12	40992
KC-10-18	22	2	24	2	26	1,120	640	1,248	3,008	33	99264
KC-10-2	57	2	59	1	26	560	600	1,534	2,694	57	153558
KC-10-18A	22	2	24	2	26	1,120	640	1,248	3,008	18	54144
KC-10-3	28	2	30	2	26	1,120	736	1,560	3,416	21	71736
KC-10-3A	37	2	39	2	26	1,120	880	2,028	4,028	15	60420
KC-10-18F	22	2	24	2	26	1,120	640	1,248	3,008	21	63168
TOTALS			302	17		9,520	6,536	14,170	30,226	261	907338

OPTION 2: Centralized CCTS at either Travis or McGuire

COURSE	CLASS DAYS	TRAVEL DAYS	TDY DAYS	PEOPLE/ CLASS	PER DIEM/ DAY (\$)	TRAVEL COST (\$)	LODGE COST (\$)	PD COST (\$)	TOTAL COST PE CLASS	TOTAL FCLASSES	TOTAL COST (\$)
KC-10-1	55	2	57	2	26	1,120	1,168	2,964	5,252	29	152308
KC-10-4	13	2	15	2	26	1,120	496	780	2,396	14	33544
KC-10-10	28	2	30	2	26	1,120	736	1,560	3,416	6	20496
KC-10-18	22	2	24	2	26	1,120	640	1,248	3,008	17	51136
KC-10-2	57	2	59	1	26	560	600	1,534	2,694	28	75432
KC-10-18A	22	2	24	2	26	1,120	640	1,248	3,008	9	27072
KC-10-3	28	2	30	2	26	1,120	736	1,560	3,416	10	34160
KC-10-3A	37	2	39	2	26	1,120	880	2,028	4,028	7	28196
KC-10-18F	22	2	24	2	26	1,120	640	1,248	3,008	11	33088
TOTALS			302	17		9,520	6,536	14,170	30,226	131	455432

OPTION 3: CCTS function at both Travis and McGuire

No TDY costs since training would be accomplished in-unit

Figure 16. TDY Costs to Attend Centralized CCTS

Centralized KC-10 Schoolhouse Yearly Operating Cost (FY95 \$M)			
	Option 1	Option 2	Option 3
Squadron	25.0	25.0	0.0
COMBS	13.9	0.0	0.0
Student TDY	1.5	0.8	0.0
TOTAL	40.40	25.80	0.00

Figure 17. Total Costs for Maintaining a Centralized KC-10 CCTS

Figure 5 is the extracted figures from the Tiger Team's total cost calculations to run a consolidated CCTS at Altus AFB (Option 1), Travis or McGuire AFBs (Option 2), and finally to transfer the CCTS duties to the operational support squadrons at each of the two KC-10 bases (Option 3).

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Vita

Major Joseph C. Miller was born 3 December 1961 in Levittown, Pennsylvania. He graduated from Mansfield Jr/Sr High School in 1979 and completed an Bachelor of Science undergraduate degree at Bloomsburg University of Pennsylvania in May 1993. He attended Officer Training School at the Medina Annex of Lackland Air Force Base Texas and was commissioned on 4 April 1995.

Major Miller's first assignment was to attend Undergraduate Pilot Training at Reese AFB. He was assigned to Wurtsmith AFB then Ellsworth AFB flying the KC/EC-135. While at Ellsworth AFB, he attended Squadron Officer School in 1991 where he was a Distinguished Graduate. Major Miller was then assigned to Seymour Johnson AFB where he became an instructor pilot in the KC-10. He followed that tour with one to McGuire AFB when the BRACC commission moved the KC-10s where he served as a flight commander and chief of the squadron standardization/evaluation branch. His experience includes being the director of all KC-10 flying operations while deployed for Operations SOUTHERN WATCH and DELIBERATE FORCE. In March of 1996 he entered the Air Mobility Warfare Center's Advanced Study of Air Mobility program under the Graduate School of Logistics and Acquisition Management at the Air Force Institute of Technology. Major Miller's follow-on assignment from ASAM is ACSC at Maxwell AFB AL.

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